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Bryan Alcorn, Contract Manager
CALIFORNIA ENERGY COMMISSION
1516 Ninth Street, MS-25
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RE: Proposed Changes to the 2005 Building Energy Efficiency Standards

Dear Bryan:

Thank you for taking time to talk with me about the barriers to geothermal heat pump systems (geoexchange systems) we have encountered in the Title 24 Building Energy Efficiency Standards.

One of the most serious barriers is the inaccuracy of the approved analysis techniques to evaluate the energy and peak power savings of geoexchange system. As you know these systems are very efficient, they reduce maintenance costs and have a long system life (ground loops carry a manufacturer's 50-year warranty). The US Department of Energy (DOE) and the Environmental Protection Agency (EPA) consider geoexchange systems to be the most efficient heating, cooling and hot water system available in the U.S. and the Federal Energy Management Program (FEMP) requires geoexchange consideration for Federal projects. However, geoexchange systems receive little if any attention by building owners and designers in California.

There are three primary reasons for this lack of attention: (1) geoexchange systems are not recognized in the Title 24 Standards and the required analysis techniques do not evaluate the systems accurately, (2) most design professionals are unaware of these systems and have no training or experience designing or installing them, indeed the only reference to geoexchange (water and/or ground-source heat pump systems) is found in the glossary and appliance efficiency sections of the standards, and there is no mention whatsoever of ground loop design or performance, (3) the cost of installation is generally higher than other commonly used systems, and due to item (1), they cannot receive the appropriate incentives to offset these costs. However, when compared to central plants, boilers, chillers and cooling towers, geoexchange systems have comparable first costs. In these cases, there may even be first cost savings, so financial incentives are not necessary.

The failure of the Title 24 Standards to recognize the true energy and peak savings of geoexchange systems presents a serious limitation for consideration by building owners and designers. Indeed, they face difficulty in securing Proposition 47 Energy Funding offered



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through Department of the State Architect for California schools, and the incentives offered through the investor owned utility Savings By Design (SBD) Program. This limitation will also reduce the level of credits provided under the U.S. Green Building Council LEED program, which is gaining increased acceptance and use throughout California. If the 2005 Standards include Time Dependent Valuation, geoexchange could be shortchanged here as well.

After listening to the HVAC system discussions at the September 4 Commission Hearing and reviewing the present drafts of the Title 24 Standards and Manuals, I have prepared a proposed temporary solution to this problem. These proposed changes are attached for your review and comment. The goal of these proposed changes is to provide an alternative technical analysis that will more accurately evaluate geoexchange systems and allow building owners and designers to obtain the financial resources needed to offset any higher first costs associated with geoexchange installations. These analysis techniques exist, but, are not approved for use in the standards.

To be clear, showing compliance with the standards is not the issue here. There are procedures and standards that geoexchange designers and installers can use to show compliance, but there is no way for them to show the extent of savings they provide beyond the minimum reference case. Therefore, it is near impossible to accurately show the true energy and peak power reductions provided by a geoexchange system.

I, therefore, respectfully request consideration of the proposed temporary step to alleviate the barrier described above, and allow geoexchange systems to be compared fairly and accurately to alternative air and water source HVAC systems.

Sincerely,

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cc Brian Heard, AEEES



10/3/03

The following are proposed changes to the 2005 Building Energy Efficiency Standards to remove present barriers to the accurate evaluation of water and/or ground-source geexchange HVAC systems.

Reference: July 2003, Express Terms – 45 Day Language

Standards for Residential and Nonresidential Buildings

SECTION 10-109 – CALCULATION METHODS AND ALTERNATIVE COMPONENT PACKAGES

NOTE: See Section 10-104 for approval of exceptional designs.

(a) Public Domain Computer Programs.

Add: **3. Building designs that include water and/or ground-source (geexchange) HVAC systems shall use a calculation method that provides reliable and accurate energy and peak power energy budgets for these systems as specified under Exceptional Methods (b) 4.**

(b) Alternative Calculation Methods (All Occupancies).

Add: 4. Exceptional Methods.

(a) The DOE 2.1E program including accepted geothermal heat pump analysis procedures shall be used to demonstrate that proposed water and/or ground-source (geexchange) HVAC systems included in nonresidential building designs meet the appropriate energy budgets.

(b) The latest version of Micropass program including accepted geothermal heat pump analysis procedures shall be used to demonstrate that proposed water and/or ground-source (geexchange) HVAC systems included in residential building designs meet the appropriate energy budgets.

Residential and Nonresidential ACM Manuals

It is also recommended that the latest version of the International Ground-Source Heat Pump Association (IGSHPA) Closed Loop/Geothermal Heat Pump Systems Design and Installation Standards be cited as the accepted practice for the design and installation of these systems, along with the applicable standards published by the American Society of Heating Refrigeration and Air Conditioning Engineer (ASHRAE).

Explanation

The goal of the proposed changes is to provide an approved simulation program and criteria for the accurate evaluation of geexchange HVAC systems in order to meet required energy budgets.

Submitted by Craig W. Hoellwarth, GREEN INQ